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Structural Studies of Prokaryotic RNA Polymerase

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Beamline(s): X9A

ABSTRACT: Transcription is the major control point of gene expression and RNA polymerase (RNAP) is the central enzyme of transcription. Our structural studies focus on bacterial RNAPs because of the high degree of conservation of RNAP structure and function from bacteria to man. We have performed work on X9A and X9B in connection with our studies of the promoter-specificity sigma factors. We have solved the 2.9 Å-resolution structure of a fragment of *Taq* SigA comprising conserved regions 1.2 to 3.1 (containing functional determinants for binding RNAP, recognizing the –10 promoter element, for melting the –10 promoter element, and for recognizing the extended –10 promoter element) using a SeMet MAD experiment. We have also solved the 1.6 Å crystal structure of a fragment of *Taq* SigA comprising conserved regions 4.1 and 4.2 (containing functional determinants for binding RNAP, recognizing the –35 promoter element, and interacting with many transcription activators and other regulatory molecules) from a SeMet MAD experiment.